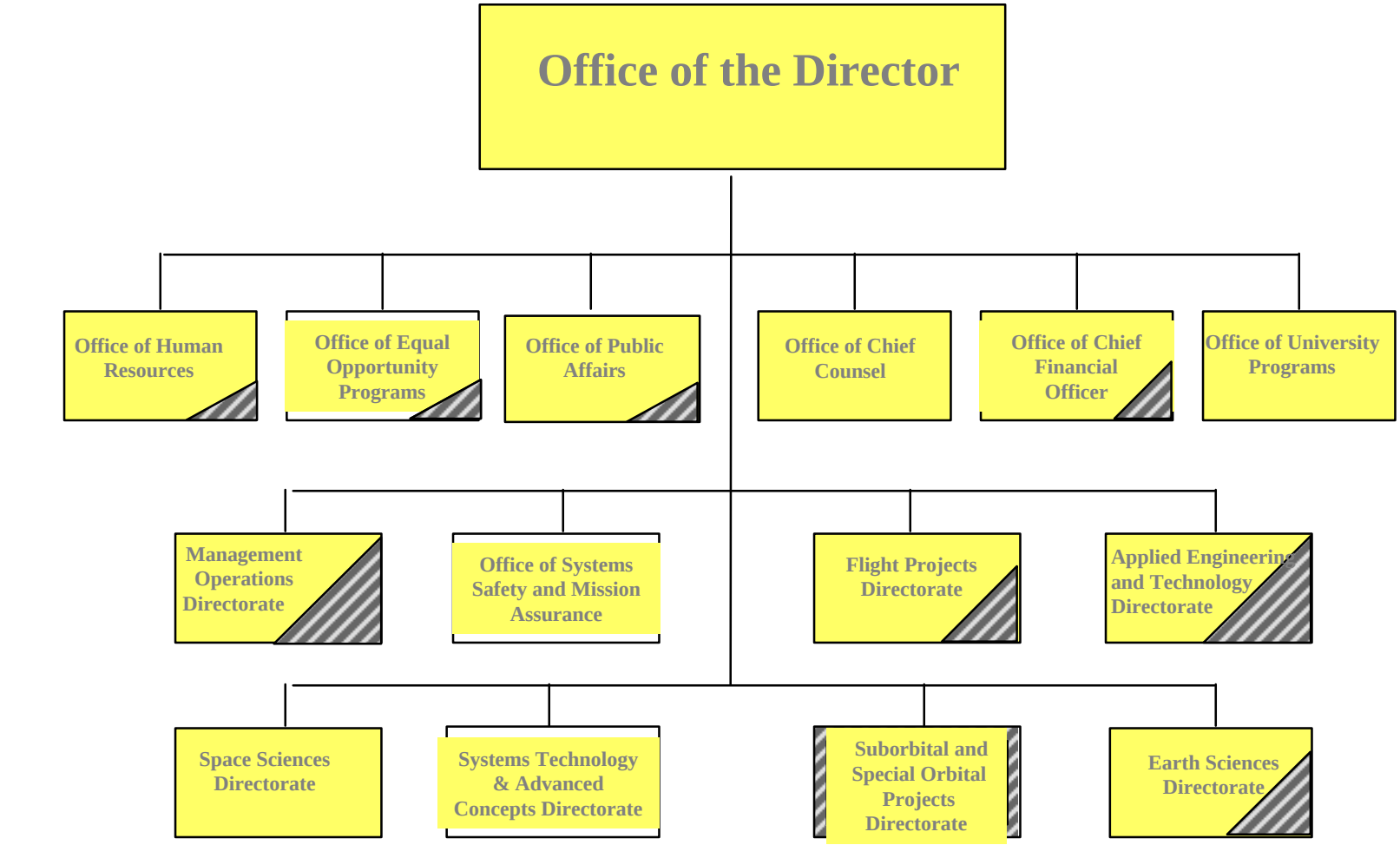
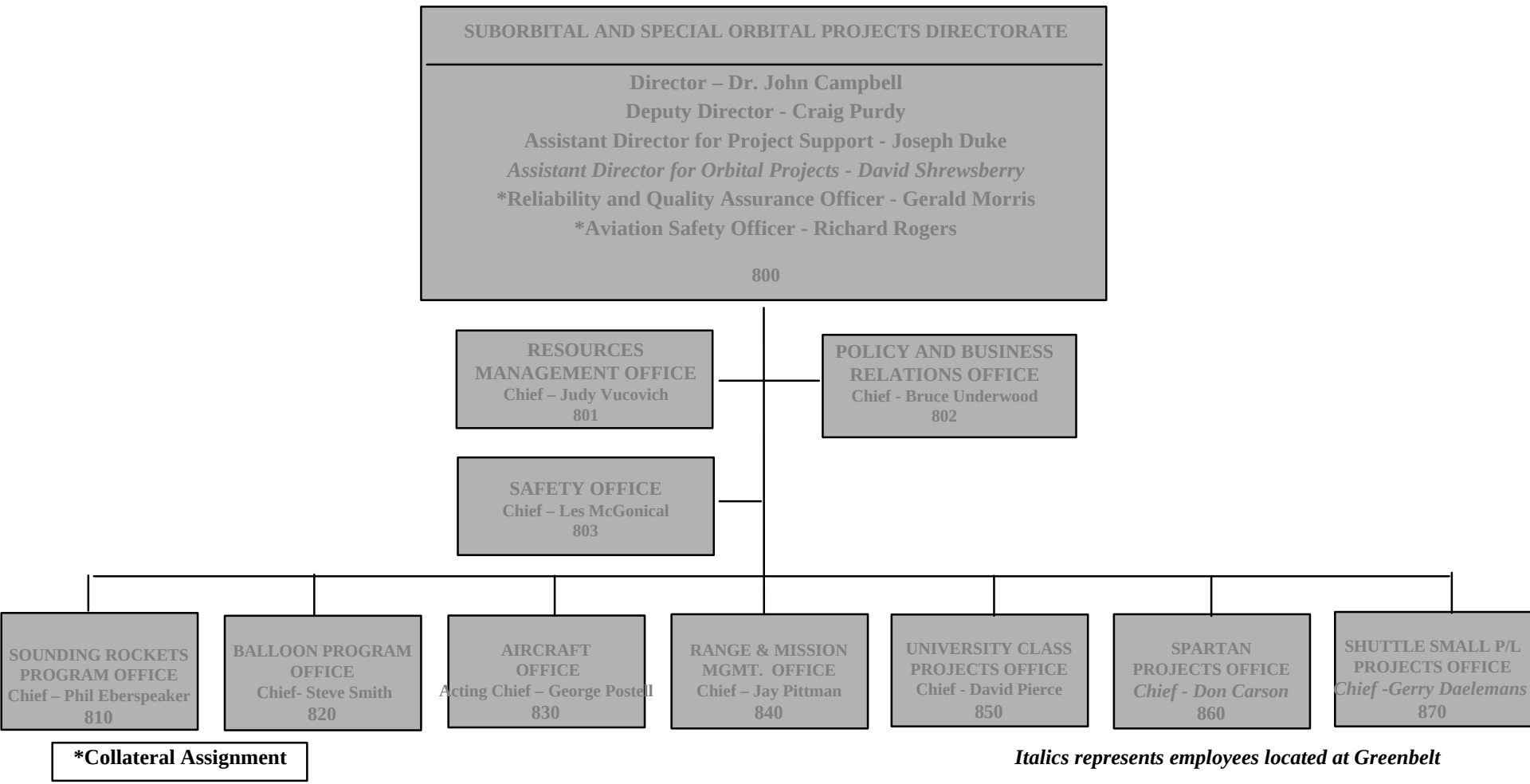
Suborbital GN Evolution

Goddard Space Flight Center



Goddard Space Flight Center
Wallops Flight Facility



***Collateral Assignment**

Italics represents employees located at Greenbelt

Suborbital GN Evolution

- ***Wallops Flight Facility Vision:***
  Wallops Flight Facility will be a national resource for providing low-cost integration, launch, and operation of suborbital and small orbital payloads.

- ***Wallops Flight Facility Mission:***
  Further scientific, educational and economic advancement by providing the facilities and expertise to enable frequent flight opportunities for a diverse customer base.

- ***Wallops Test Range provides crosscutting services and technologies to a diverse customer base. (sounding rockets, balloons, UAVs, ELVs, RLVs, ground and aircraft based experiments)***

- ***Current technology environment has candidate projects competing via specific programs and requirements.***

National Range Technology Efforts

- ***National interest in the health of U.S. Launch Ranges emerged as a high profile issue as result of recent federal studies***
  - ***Congressional National Launch Capabilities Study (1998)***
  - ***OSTP/NSC study (2000)***
  - ***National Academy of Sciences study (2000)***

- ***Recommendations included making range technology a national priority and an integrated solution***

- ***Advanced Range Technology Working Group (ARTWG) formed by NASA and USAF to lead national efforts***
  - ***Consists of U.S. organizations interested in range technology***
  - ***1st meeting held 8/00. Generally meets semi-annually***
  - ***Numerous subcommittees established***

ARTWG Charter

- **Charter:**
  - Identifying technology needs for broad spectrum of launch sites & users
  - Establishing/maintaining a national vision and roadmap
  - Recommending approaches, options, & strategies
  - Collecting/disseminating information, & enabling tech. transfer
  - Identifying paths for technology pursuit/collaborations
  - Advocating the need for investments

- **Focus**
  - "Traditional" launch range responsibilities
  - Orbital-class missions (ELVs & RLVs)
  - Near and longer term
  - Established and future "spaceports"
  - Government & non-government needs

- **ARTWG is not a funding source**

- **ARTWG has no binding authority**

Wallops Range Technology Efforts

- ***Wallops established the Advanced Range Technology Initiative (ARTI) formally in 1998****
  - *To focus & infuse technology into numerous modernization efforts*
  - *Pursue technologies that also offered benefits to the national launch range community*

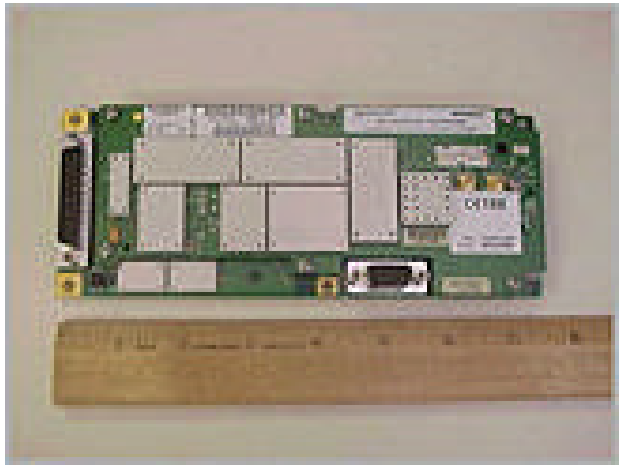
- ***ARTI Charter***
  - *Lower range operations costs*
  - *Increase range capabilities, capacity, reliability, and flexibility*
  - *Increase safety and/or assure safety in a less-"intrusive" manner*

- ***Focus***
  - *Prototyping and flight demonstrating*
  - *Wallops areas of expertise (e.g., range instrumentation, range safety)*
  - *Utilizing Wallops range as a range testbed environment*
  - *Leveraging Wallops low-cost flight carriers to validate technologies*

ARTI

- ***ARTI is:***
  - ***Multi-disciplined***
  - ***Funded through numerous sources***
  - ***Collaborative***

- ***Major Current Efforts***
  - ***Flight modem***
  - ***STARS***
  - ***Autonomous Flight Termination System***
  - ***Simulated mission environment***
  - ***Next-gen mobile range architecture***
  - ***Rapid Response Range demonstration***



Flight modem

The Space Launch Initiative (SLI) is the centerpiece of NASA's long-range Integrated Space Transportation Plan, which also includes near-term Space Shuttle Safety Upgrades and long-term research and development for 3rd Generation RLV Technologies and In-Space Transportation Systems.

NASA's specific goals for a 2nd Generation RLV are to:

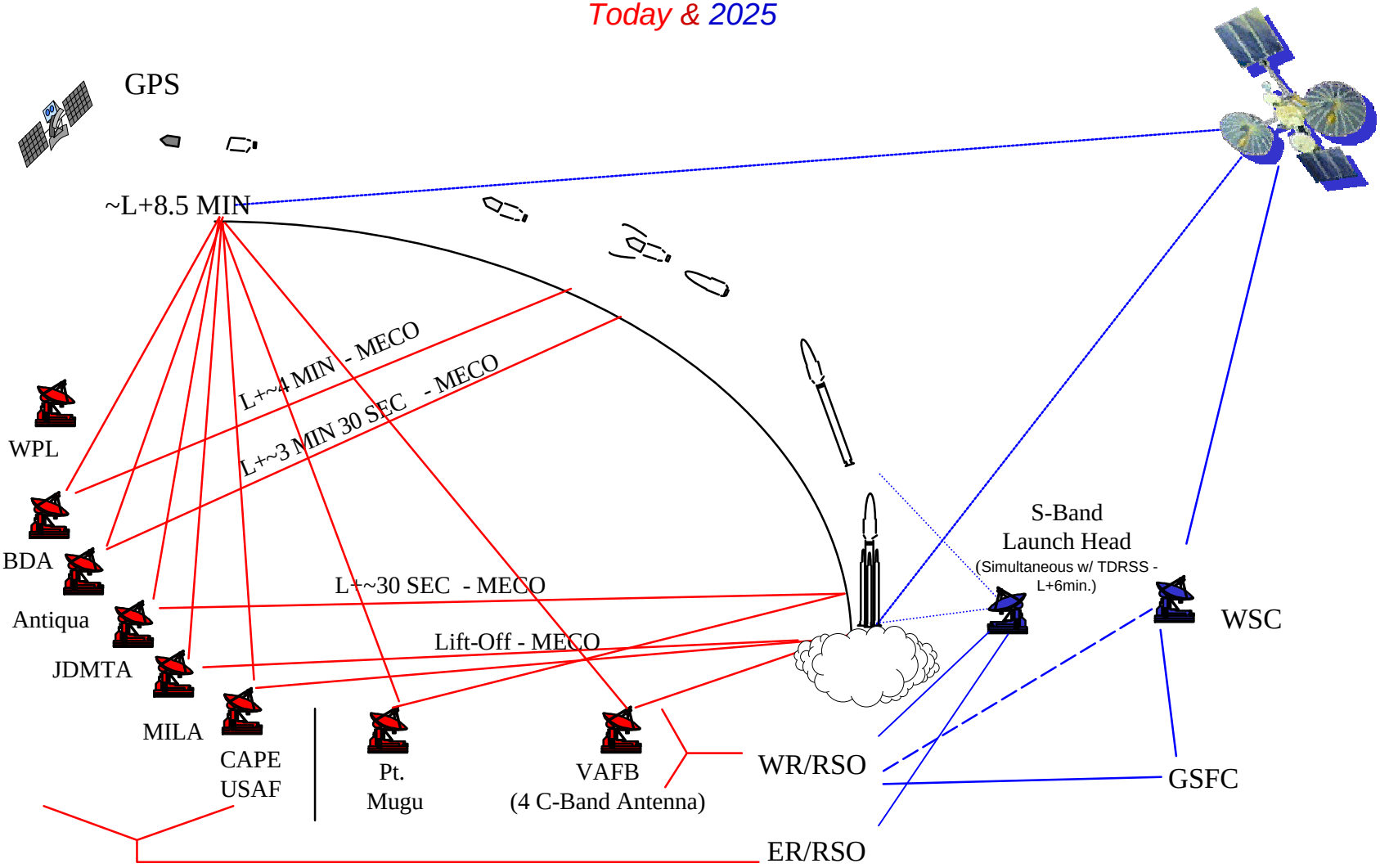
- Reduce the risk of crew loss to approximately 1 in 10,000 missions
- Lower the cost of delivering payloads to low-Earth orbit to less than $1,000 per pound

By reducing technical, cost and business risks to acceptable levels, the SLI will enable full-scale development of a 2nd Generation RLV around the middle of this decade. A new system could be operational early next decade.

Demonstrate the capability of a Space-Based platform to provide range and range safety support and to evaluate a reduction in the operational cost of ground based range assets by providing a reliable communications link for 2nd generation reusable launch vehicles utilizing current state-of-the-art satellite technologies.

Space Based Range Concept

Space-Based Range and Range Safety
Today & 2025



Special Appropriation

- ***Dramatically reduced FY02 Ground Network budget for support of Wallops Research Range led to Congressional concerns***

- ***NASA FY02 Appropriation designated $10M for investments in Range***

- ***GSFC is using funding for 20 discrete tasks that:***
  - ***Fix critical problems***
  - ***Enable capture of new business***
  - ***Provide new capabilities***
  - ***Don't have another reasonable path for funding***

Special Appropriation Tasks

Technology

- Rapid Response Range Demonstration
- Flight Modem Development
- Mobile Range Architecture Study
- ARTI Laboratory Environment

Critical Upgrades

- Airborne Surveillance Radar Replacement
- Ground Surveillance Radar Installation
- Flight Termination System Hardware Replacement
- Control Center UPS Replacement
- RCC Real-Time Computer and Data Acquisition System Replacement
- Timing System Upgrade
- Mobile RCC System Completion
- Wind Weighting System Modernization
- Range Scheduling and Documentation System Development

Infrastructure/New Capabilities

- New Payload Processing Facility
- M-20 Processing Facility Upgrades
- Crew Survivability Test Infrastructure
- Liquid Vehicle Fueling Systems Recovery System Capability Enhancements
- Titan II Assessment Study